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September 9, 1961
VOL. 80, NO. 11 PAGES 161-184

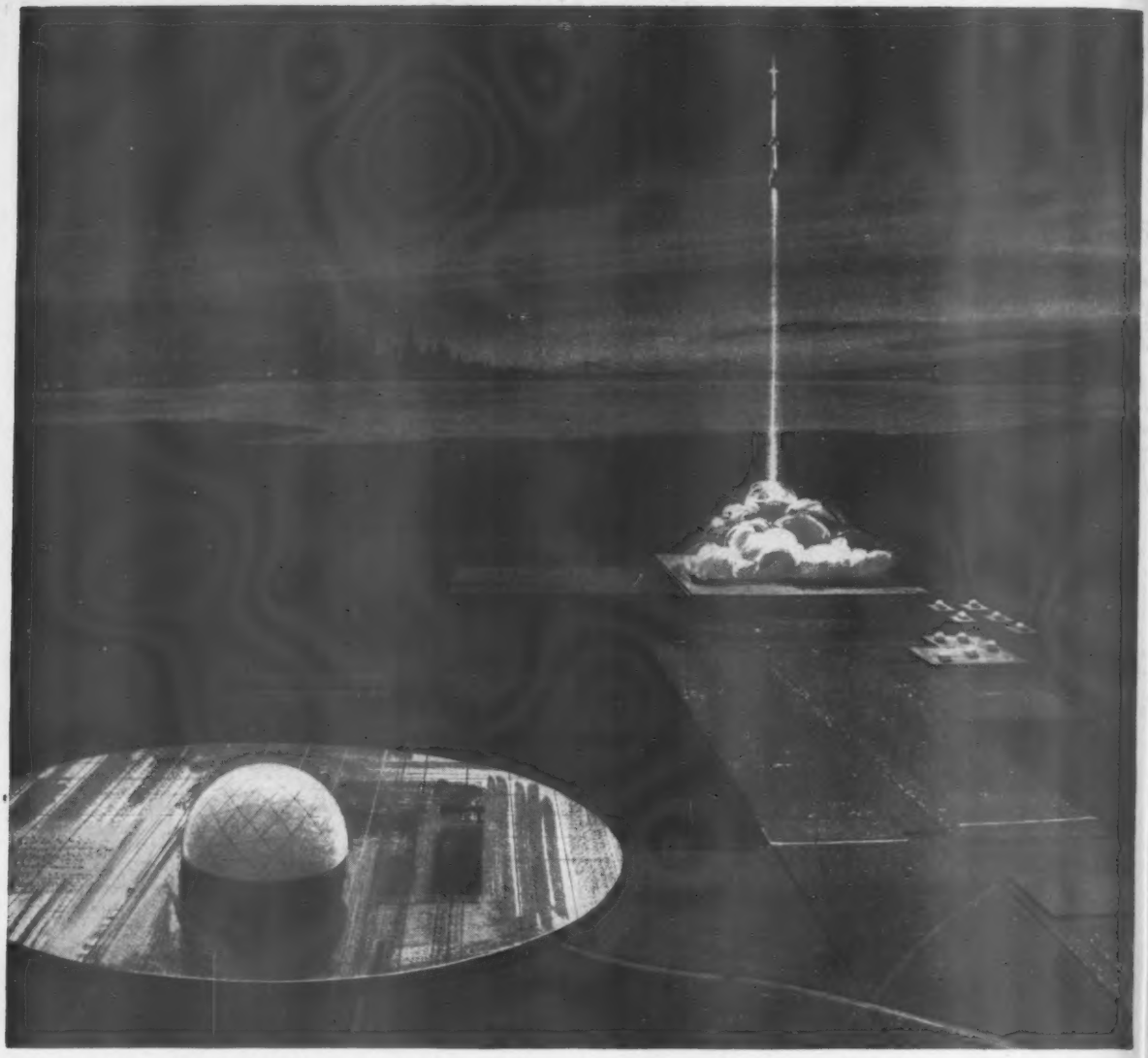
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

Spraying by Plane

See Page 178

A SCIENCE SERVICE PUBLICATION



More than 450,000 pounds of thrust lifts the U. S. Army's Nike Zeus missile skyward in a cloud of vapor. The Nike Zeus missile being developed for the project by the Douglas Aircraft Company will be designed to intercept ballistic missiles traveling over 15,000 miles per hour, and destroy them at a safe distance from the defended area.

How do you stop an ICBM?

How do you detect, track, intercept—and destroy within minutes—an ICBM that is moving through outer space ten times faster than a bullet?

Bell Telephone Laboratories may have designed the answer: Nike Zeus, a fully automated system designed to intercept and destroy all types of ballistic missiles—not only ICBM's but also IRBM's launched from land, sea or air. The system is now under development for the Army Ordnance Missile Command.

Radically new radar techniques are being developed for Nike Zeus. There will be an acquisition radar designed to detect the invading missile at great distances. And a discrimination radar designed to distinguish actual warheads from harmless decoys that may be included to confuse our defenses.

The system tracks the ICBM or IRBM, then launches and tracks the Nike Zeus missile and automatically steers it all the way to intercept the target. The entire engagement, from detection to destruction, would take place within minutes and would span hundreds of miles.

Under a prime Army Ordnance contract with the Western Electric Company, Bell Laboratories is charged with the development of the entire Nike Zeus system, with assistance from many subcontractors. It is another example of the cooperation between Bell Laboratories and Western Electric for the defense of America.

BELL TELEPHONE LABORATORIES

World center of communications research and development

BIOLOGY

Urge Human Sperm Banks

A genetics expert believes human sperm banks must be established to prevent radiation damage to future generations. Persons working with high-level radiation would benefit most.

➤ A WORLD FAMOUS geneticist has declared that human sperm banks must be established to prevent harmful radiation damage to future generations.

Dr. Herman J. Muller, Nobel Prize winning zoologist from Indiana University, recommended that sperm banks be made available now to young persons working with or exposed to high-level radiation. The sperm bank like the blood bank, would be strictly voluntary.

Human sperm would be frozen and stored far underground. The sperm cells would last for many years until they were needed, Dr. Muller told the American Institute of Biological Sciences meeting in Lafayette, Ind.

One start would be to make sperm banks available to families of all armed forces of the nuclear age and those working with radiation or participating in high-altitude flights. Plans are already under way, Dr. Muller said, for intensive development of high-altitude commercial flights that would be dangerous for crews and passengers alike due to the high cosmic and solar radiation.

The success of the controversial plan for a sperm bank would depend on voluntary acceptance of artificial insemination by families.

"Dictation of the plan, whether by politicians, physicians or geneticists, would tend to be self-defeating," Dr. Muller said.

He envisions a group of sperm banks staffed by scientists and technicians. Sperm brought to the bank would be recorded in the individual's name and then stored at temperatures about 330 degrees below zero Fahrenheit.

Certain persons, such as those with mental illnesses, must necessarily be excluded from the program, Dr. Muller said.

"It is difficult to estimate when the sperm banks would become widely accepted," Dr. Muller told SCIENCE SERVICE. However, the scientist views it as another step from the present practice of artificial insemination. Dr. Muller won the Nobel Prize for discovering that radiation causes inherited changes in the reproductive cells of living organisms.

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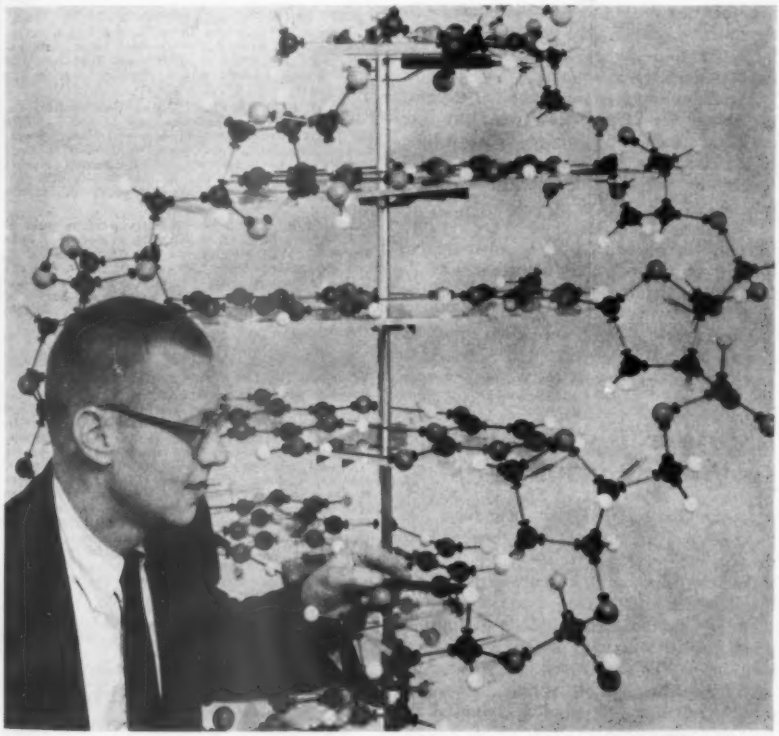

DNA MODEL—A scale model of the key to cell reproduction, deoxyribonucleic acid, DNA, displayed at the American Institute of Biological Sciences, Lafayette, Ind., was made by Central Scientific Co., Chicago. Dr. Quentin Petersen, Wabash College, Crawfordsville, Ind., shows a segment of the DNA chain he originally built. The entire chain would measure nearly three city blocks.

Artificial Breeding

➤ ARTIFICIAL breeding programs for livestock are now believed practical for undeveloped countries.

West Virginia University scientists have developed a chemical solution that keeps sperm alive for long periods without refrigeration. The solution is expected to make artificial insemination of livestock practical in countries lacking refrigeration facilities.

Sperm cells of livestock have remained active even after being stored a week in the solution, Dr. Erwin Goldberg told the American Society of Zoologists meeting in Lafayette, Ind., as part of the American Institute of Biological Sciences. The chemical solution consists of sugar, antibiotics and a few simple salts.

With the present expensive methods of storage by refrigeration, sperm are active only two to three days and are subject to damage from the cold.

About 90% of the dairy cows in the United States are artificially inseminated. Artificial breeding with sperm stored in the new solution could also help reduce the food shortages in poorer countries, Dr. Goldberg said.

The experiments were conducted at West Virginia University laboratories, Morgantown, W. Va., by Dr. Goldberg, Dr. Charles Norman, Dr. I. D. Porterfield and C. J. Johnson. Future experiments on the human sperm are planned.

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Cell Measures Radiation

➤ A TINY living cell is the new yardstick for measuring the radiation hazard in space.

Bacterial spores riding on United States satellites into space developed a high degree of resistance after being pelted by a heavy dose of radiation. This new-found strength will be used as a "biological index" to test the effect of space radiation on living matter.

Spores recovered from Discoverer satellites XVII and XVIII were dunked in a hot sugar solution. Most of the spores survived. But similar bacterial spores untouched by radiation died immediately.

The tiny cells were stored in capsules above the Discoverer satellites. A stream of charged particles from a solar flare bombarded the Discoverer XVII satellite while it orbited around the earth. Both satellites, which were in orbit about three days, were launched late last year about a month apart.

The biological research on space radiation was conducted at the U.S. Air Force Aerospace Medical Center, Brooks Air

Force Base, San Antonio, Texas. Major Irving Davis, head of the program, described the research at a space symposium of the American Institute of Biological Sciences, Lafayette, Ind.

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Cancer Found in Trout

➤ CANCER has been found in every trout fish hatchery in the United States.

A national survey conducted on Federal, state and local levels has shown that more than half of all rainbow trout artificially raised have cancer of the liver. The cause of the cancer is unknown.

In some hatcheries examined, every rainbow trout had cancer. The lowest figure reached was 10%, U.S. Fish and Wildlife experts, Drs. S. F. Snieszko and John A. Miller, reported.

The cancerous growth is not very malignant, causing very few fish deaths. No cases have yet been reported in which the disease was transmited from one animal to another, the scientists emphasized.

"The public should not be excited, because the chances of getting cancer by eating the diseased trout is virtually nonexistent," Dr. Snieszko said.

The commercially prepared dried foods now fed to the fishes may contain the cancer-producing (carcinogenic) substances. The foods contain some meat plus additives such as vitamins and growth stimulants. The dried foods appeared on the market just ten years ago, causing many scientists to suspect them as the culprit.

The easy life of the fishes, eating all the food they want while growing rapidly, has also made the rainbow trout especially prone to diseases, the scientists told the American Society of Limnology and Oceanography meeting at the American Institute of Biological Sciences, Lafayette, Ind.

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Hormones Aid Flowering

➤ COLORFUL PLANTS such as azaleas, African violets and chrysanthemums bloom much earlier by being injected with new hormones.

University of Wisconsin scientists, Drs. R. H. Roberts and B. E. Struckmeyer, have extracted blossom-stimulating hormones called anthogens from various plants. The hormones were used successfully on about 70 varieties of plants, the scientists told the American Institute of Biological Sciences meeting, Lafayette, Ind.

Three separate anthogens were isolated from plants in various stages of blooming. The hormones were then mixed with water and sprayed on the leaves of young plants.

Anthogens are fatty substances with a greasy feel, belonging to a group not generally credited with having physiological activity. Anthogens are especially promising in treating plants that take a long time to flower. African violets sprayed with the hormones came into full bloom even before tiny blossom buds appeared on untreated violets the same age.

The earlier flowering reduces the expenses of growing greenhouse plants, the scientists said. Rapid growth of leaves, which normally accompanies flowering in nature, was also observed in stimulated plants.

The University of Wisconsin experiments show that the plant's response to days of different length (photoperiodism) is not the supposedly full explanation of why plants blossom. Photoperiodism does set up conditions, called "ripeness to flower," needed before applying the hormones.

The chemicals stimulating the "ripeness to flower" probably interact with the isolated hormones, and the flowering begins, they said.

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Lichen Splits Into Two

➤ LICHEN, a tiny plant frequently found clinging to rocks, will separate into two plants if it does not like its location.

Lichens, which are actually a partnership between two lowly plants, algae and fungi, will split into these two plant groups if not enough water and food are present. The separated plants will then grow apart from each other, Dr. Vernon Ahmadjian, biologist at Clark University, Worcester, Mass., reported.

Dr. Ahmadjian's experiments show that lichens form "only as a matter of necessity, when both fungus and alga are in need of each other." If conditions favor independent growth, the lichen will not form, he told the Mycological Society of America meeting in Lafayette, Ind.

Algae are tiny organisms familiar to most persons as the green scum found on lake or pond surfaces. Fungi, which include such well-known plants as molds and mushrooms, are parasitic, depending on others for their food supply.

"The two organisms must be forced into forming the lichen," the scientist stated. During the union, the fungus obtains its food from the alga, while protecting the alga from drying up.

The meeting was sponsored by the American Institute of Biological Sciences.

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PUBLIC HEALTH

Amateur Divers Advised To Wear Porous Suits

➤ AMATEUR DIVERS are advised to wear suits of porous rubber if they wish to dive in cold waters.

Surgeon Lieutenant Antony Jarrett of the Royal Navy in a study of naval frogmen reported in the British Medical Journal, Aug. 19, 1961, states "reversed ear" was seen in 14. This is a condition in which tiny hemorrhagic spots appear in the ear canal, caused by a partial vacuum within the watertight rubber suit worn by the frogmen.

The basic cause of the reversed ear syndrome, Lt. Jarrett says, is that the watertight rubber suit converts the external ear canal into a closed cavity within which the pressure may fall below that of the body.

A porous rubber material cannot possibly maintain a partial vacuum, the surgeon officer added, so the hemorrhagic spots that form in the skin under the wrinkles of a watertight suit do not form. A porous suit maintains body temperature efficiently, he reports, as it fills with and holds water in the same way that a woolen garment normally fills with and holds air.

Ear plugs should never be worn when traveling by air or when diving, Lt. Jarrett says, as there is danger of reversed ear when anything closes off the external auditory canal. "Reversed ear" is a term that has long been used by professional divers, but it is only this year that Lt. Jarrett reports the cause in Great Britain.

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PHYSICS

New Particle Discovered

➤ THE DISCOVERY of a new elementary particle, omega meson, made at the University of California's Lawrence Radiation Laboratory, and the finding of unidentified additional "particle systems" in the subatomic realm are believed to make it possible to push on in the next decade or two to a better explanation of how matter is put together. More than 30 so-called elementary particles are known.

The new elementary particle discovery gives important insight into the structure and behavior of the atomic nucleus. It plays an important role in the structure of protons and neutrons, the basic building blocks of atomic nuclei.

The mass of the omega is 1540 electron masses. Like the neutron, the omega has no electrical charge. The research is reported in Physical Review Letters, 7:178, 1961. The responsible researchers are Dr. B. C. Maglic, visiting scientist from Yugoslavia, and Drs. Luis W. Alvarez, A. H. Rosenfeld and M. L. Stevenson, physics professors on the Berkeley campus. The research program of the Laboratory is supported by the Atomic Energy Commission.

The discovery was made by means of a three-part high energy particle research system at Berkeley: the 6.2 billion electron volt (Bev), bevatron; the 72-inch liquid hydrogen bubble chamber in which particle tracks are photographed; and an extensive analytical complex.

Identification of the particle was achieved through precise measurement and analysis of bubble chamber photographs of the tracks of particles created when antiprotons and protons come together and annihilate.

The omega, predicted several years ago on theoretical grounds, was found only through a highly sophisticated approach. The difficulty arose from the fact that the particle has an extremely short lifetime (about ten thousand billion billionths of a second or more precisely, ten raised to the minus 22nd power). Because of this short lifetime and its electrical neutrality, it does not make a track of its own in the photographs. Essentially, the omega breaks up into three pi mesons (or pions, the lightest weight mesons). Immediately afterward it emerges from the annihilation zone.

The problem of the scientists was to select photographs in which the event seemed possible, to work back from the observable particles toward the annihilation, and to prove that three observable pions came from the break-up of an unobservable omega.

Some 30,000 photographs were analyzed. In 90, analysis showed that the presence of omegas was essential to explain the observable phenomena.

Two years ago scientists at Stanford University measured the size of the electrical cloud of the proton and neutron by means of high energy electrons, and the "electrical size" proved to be smaller than the "nuclear size."

Theoretical physicists suggested that the smaller electrical size could be explained if there existed in the cloud of mesons, in addition to pions, two heavier types of mesons. Rho and omega were the names given to the two predicted mesons.

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TECHNOLOGY

No Peaceful A-Tests Soon

➤ A SPEEDY END to the current United States ban on nuclear tests would not mean that Project Chariot, the proposal for using atomic bombs to dig an Alaskan harbor, would be undertaken soon, John S. Kelly, chief of the Atomic Energy Commission's nuclear explosives branch, said in Washington, D. C.

Mr. Kelly said biological and environmental studies to determine fallout effects on the northwest Alaskan coast, site of the venture, are still in progress, with "gaps in our knowledge" as yet unfilled.

Even if the project is cleared and authorized, construction work that will take more than a year is necessary before the blast can be set off.

"Even if somebody said, 'Go as fast as you can,' it would still be quite some time before Chariot is ready," he told SCIENCE SERVICE (See SNL, 79:375, June 17, 1961).

Another project in the AEC's Plowshare program for peaceful uses of atomic energy is "well ahead of Chariot" from the planning and construction standpoint, Mr. Kelly said. This is Project Gnome, a thermal energy experiment in New Mexico.

Project Gnome will employ a 10-kiloton device detonated underground in a dry salt deposit near Carlsbad, N. M. It will test the practicality of pumping steam or other superheated gases from a blast-created "fireball" cavity.

A shaft 1,200 feet deep connects with a lateral tunnel leading to the "fireball." Water will be pumped into the cavity, converted into steam and used to operate a generator.

The original power production conception for Gnome has been expanded to include tests of instruments recently developed to detect and monitor underground blasts.

The Chariot project was criticized by the Committee for Nuclear Information, St. Louis, last June as a potential threat to the entire Alaskan "food chain" of plants, animals and men. The St. Louis committee said fallout might affect lichen eaten by caribou, which are in turn eaten by humans.

AEC established Plowshare in 1957, but the first shot in the program has yet to be fired. The U. S. ban on nuclear testing was announced on August 22, 1958, following a Russian test ban on March 31 of that year.

Mr. Kelly and his AEC group are optimistic about the industrial possibilities of well-placed bombs. They believe, for example, that the nation's water resources could be increased by blasting surface lakes for storage, or canals to divert water from a "wet" area to a dry one. In arid regions where normally dry streams reach seasonal flood stages, an explosion could be planned to create a permanent "rubble zone," rather than a crater. When the man-made basin overflows, the water would soak into the permeable rubble and be stored, instead of first flooding the surrounding plain and then evaporating.

A nuclear blast might be used to strip natural barriers from an ore deposit to make it accessible for open-pit mining.

The Canadian government and oil interests would like to see nuclear blasts tried as a means of getting at the Athabasca Tar-sands oil deposits, mixed with sand and silt under 17,000 square miles of land in Alberta province. It cannot be profitably pumped now, although the potential yield is gauged at twice the known reserves of recoverable liquid oils in the world.

Underground blasts, Mr. Kelly said, might cause the silt and sand to settle to the bottom of newly made cavities and shoot the liquid oil to the surface for recovery from pools.

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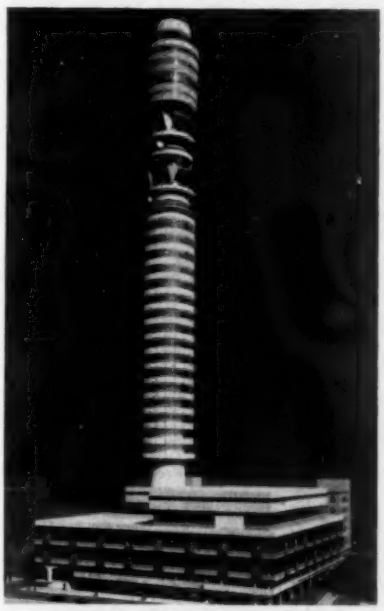

TALLEST TOWER—The new post office building in London will have the tallest tower in the city, 563 feet, when completed. At the 500-foot level, a restaurant will provide visitors with a bird's eye view.

PSYCHOLOGY

Physicians Fear Death

➤ PHYSICIANS are more afraid of death than are their patients.

In fact, Dr. Herman Feifel, psychologist of the Veterans Administration Outpatient Clinic and the University of Southern California School of Medicine, Los Angeles, reported one of the major reasons physicians enter a career in medicine is to control their own above-average fears concerning death.

Some of the obstacles thrown in the way of a study of the attitudes of critically ill patients toward death were described by Dr. Feifel at the American Psychological Association meeting in New York. Reluctance to discuss this taboo subject was encountered, not in patients, but in the physicians and hospital authorities.

"The one thing you never do," professional personnel told him, "is to discuss death with a patient."

When, finally, with the almost surreptitious help of a staff physician, Dr. Feifel was able to interview a small number of seriously ill patients, he met with "refreshing frankness and cooperativeness." An unexpected result was a psychotherapeutic effect in some of the patients as a result of the open discussion of their attitudes toward death.

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Hide Facts About Suicide

➤ DIFFICULTIES hindering research in another taboo area, suicide, were described to the American Psychological Association meeting in New York by Drs. Edwin S. Shneidman and Norman L. Farberow of the Suicide Prevention Center, Los Angeles.

Not only relatives, but responsible members of the community, join in efforts to cover up and hide the facts about suicide, Dr. Shneidman indicated. This attitude even affects the wording of death certificates. He told of individuals who obviously committed suicide by stabbing themselves in the chest but who were certified as natural death from heart failure or accidental death from running into a knife.

One sheriff-coroner has reported only a couple of dozen suicides for a city of over one-half million. A look at his files showed that he was reporting as suicide only those deaths where he had found a verified suicide note.

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Dog Can Be Therapist

➤ A DOG with which a problem child can romp, cuddle, and exchange love can actually serve as "co-therapist" to help in healing the child's emotional wounds, Dr. Boris M. Levinson of Yeshiva University, told the American Psychological Association meeting in New York.

A dog, Dr. Levinson said, can satisfy the child's need for physical contact and his need for loving safely without fear of losing the love object. This dog can be a "companion, friend, servant, admirer, confidante, fellow conspirator, slave, scapegoat, mirror, trustee and defender."

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Mental Health Research

➤ THE PSYCHOLOGIST who wants to do research on community mental health must know how the local government functions, what the school system is trying to do and how local public health clinics operate, as well as other matters not ordinarily within his field, it was reported at the American Psychological Association meeting in New York.

The researcher in the field of community mental health must be a combination missionary and salesman in order to get the community to tolerate such an investigation, for many individuals will regard the intimate questions asked as a nuisance. But the psychologist must be careful not to oversell his product for the temptation is to promise more than psychologists can give. The psychologist has the responsibility to be sensitive to community needs while not sacrificing his scientific values. The primary object of community mental health research is to find answers to questions such as these: Is mental illness more prevalent in slum areas or among the wealthy or those in moderate circumstances? Does the strain of driving to work in badly snarled traffic conditions lead to emotional breakdown? Does a well-administered local government help to build sound mental health? Do good sanitary conditions and the enforcement of wise public health regulations contribute to community mental health? Is there a relation between the prosperity of local churches and good mental health?

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Cancer Patient Gives Up

➤ WHEN A PATIENT is told he has cancer, he is likely to regard the diagnosis as hopeless despite the ever increasing number of survivors. Not infrequently, he reacts with anxiety and depression, Dr. Martha Schon, Memorial Sloan-Kettering Cancer Center, told the American Psychological Association meeting in New York.

Such a disturbed patient presents a treatment risk, Dr. Schon said, especially if surgery is involved. The active participation of a psychologist in the management of emotional problems helps not only the patient, but also the attending physician.

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EDUCATION

Education Bill Urged

➤ LEADING SCIENTISTS and educators are convinced that full-scale continuation of the National Defense Education Act, blocked by the House Rules Committee, is a key factor in America's scientific progress.

They are not happy about the promised last-ditch drive to extend the law's student loan provisions before Congress adjourns. There are other provisions just as important to a balanced and progressive program, if not as attractive politically, they point out.

The original bill to extend the NDEA was tied to a controversial measure for private and parochial school loans. The Rules Committee refused to release it for a floor vote.

First passed in 1958, the act offers financial help to needy and able students through loans administered by colleges. The emphasis is on science, mathematics, engineering and foreign languages.

This single section of the many-sided program may get top pre-adjournment priority because, as one observer put it, "most Congressmen do not want to go home and tell their constituents that Junior can no longer get a loan to go to college and become a scientist."

The eight prominent signers of a statement urging Congress to extend the entire law are pleased with the loan set-up, but make equal mention of other major help toward the improvement of science and mathematics instruction brought about by NDEA.

Included are grants to high schools for laboratory equipment, books and teaching facilities; grants enabling states to hire mathematics supervisors and scientific consultants to improve classroom teaching; grants to widely scattered universities to develop new programs for graduate students, and grants to graduate students themselves to help them train to become college teachers, now greatly in demand.

"The job is well started, but far from complete," they maintain. "There is good momentum now. . . . These improvements in science education are too vital to the welfare of the nation to allow the act to be weakened."

The signers are Detlev W. Bronk, National Academy of Sciences president; James B. Conant, Harvard University president-emeritus; Lee A. DuBridge, California Institute of Technology president; Frederick L. Hovde, Purdue University president; James R. Killian, chairman of the Corporation of the Massachusetts Institute of Technology; George B. Kistiakowsky, Harvard chemistry professor; Thomas Park, president of the American Association for the Advancement of Science; and J. A. Stratton, Massachusetts Institute of Technology president.

NDEA stays in effect until June 30, 1962, but states and educational institutions claim they need a year's lead time to provide matching funds to supplement the Government's share.

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MATHEMATICS

Find "Pi's" 100,000 Digits

➤ TWO SCIENTISTS have used an electronic computer to determine the value of "pi" to 100,000 digits.

The computation was done by two methods as a check on how accurately a computer can compute. Both methods gave the same answers. The computer twice determined that the last ten of the 100,000 digits for pi are: 5493624646.

It took the computer eight hours to make the calculations. In comparison, it would take a man, working eight hours a day without error on a desk calculator, 30,000 years to make the same computation. This is an indication of the relative speeds of machine and man.

Pi is the ratio of the circumference of a circle to its diameter. Its value, to ten decimal places, is 3.1415926535. (The figure 5 is correct for last place. Since the digit following five is eight, the five is usually rounded off to six.) Also using computers, its value had previously been computed to 16,167 decimal places in Paris. Before computers were developed, men spent years finding pi's value to many decimal places by hand.

However, no matter to how many decimals places the value of pi is computed, there is no end. Also there never is any periodic repetition in the sequence of figures. Pi is therefore called an irrational number.

The computation was made on an International Business Machines 7090 computer under the direction of Drs. John W. Wrench, Jr. and Daniel Shanks of the U. S. Navy's David Taylor Model Basin at the IBM Datacenter in New York.

One use of the 100,000 decimal places generated by the computer to find the value of pi is in statistical studies of the distribution of digits, of interest and importance to scientists.

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CIVIL DEFENSE

Plans for Emergencies

➤ NEWLY BUILT cities should make plans for "smooth-flow" traffic so they can be evacuated swiftly and efficiently in case of a nuclear attack warning, a Canadian geographer believes.

Dr. Bogdan Zaborski of the University of Ottawa favors a set of one-way, arc-shaped avenues running west to east, curved toward the business center and connected to mildly merging snake-shaped streets, for a smooth-flowing road pattern. A few added north-south arteries, where they are needed for quick travel between industrial and business districts, would be at different levels than the east-west routes by means of overpasses or underpasses.

The main roadways would be restricted to moving traffic. The pavement would be widened at intervals to provide "bays" for bus stops. Side lanes would be used for visits and deliveries in residential sections.

"The whole road network will serve then as one-way communication lines leading out of the center of the city," Dr. Zaborski told the Association of American Geographers meeting at Michigan State University in East Lansing, Mich.

Automobiles would have time to go six miles in a 15-minute warning period and 15 miles in a 30-minute warning period, he said. Primitive earthen or rock shelters, facing away from the blast direction, could be built along the escape route if more expensive protective measures could not be undertaken.

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Better Maps Aided North

➤ USEFUL MAPS were scarce at the start of the Civil War, and the North's superior mapmaking facilities gave them "a distinct advantage" over the South, the Association of American Geographers meeting was told.

A. Philip Muntz of the National Archives, Washington, pointed out that the Union was lucky enough to retain "the organization, files, equipment, and most of the personnel" of the two Federal agencies then responsible for topographical mapping, the Corps of Topographical Engineers and the Coast Survey.

The mapmakers "contributed significantly to the Union victory" by producing thousands of detailed maps needed to plan and carry out successful campaigns, he said. Many of the maps have been preserved and are kept at the Archives.

The geographers are meeting at Michigan State University, East Lansing, Mich.

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OCEANOGRAPHY

Automatic Buoys Map Atlantic Coast Currents

➤ A STRING of automatic buoys along the United States Atlantic coast is now measuring the ocean currents.

Woods Hole Oceanographic Institution scientists have planted 14 buoys strung out along a 670-mile line stretching from New England to Bermuda. Bobbing on the open ocean in waters up to three miles deep, the floats are automatically recording oceanographic data continuously, Dr. William S. Richardson, director of the project, reported.

The project is the first of its kind. Offshore currents, including the Gulf Stream, will be measured, as will surface winds.

The brightly colored plastic floats have a ten-foot metal tripod that houses the recording equipment. Current measurements obtained from instruments attached to the buoy's dangling anchor cable are recorded on film. A radio transmitter beams out signals identifying the buoy to ships that spot this lone sentinel on the open seas.

Dr. Richardson spoke at a symposium on oceanographic instrumentation in Washington, D. C.

• Science News Letter, 80:167 September 9, 1961

ASTRONOMY

Fast Dimming Nova Found in Sagittarius

➤ A NEW NOVA, a star that suddenly increases its light and energy output and then fades again, has been found in the constellation Sagittarius, the archer.

Before the star brightened, it could not be seen on photographs taken with the 200-inch telescope on Mt. Palomar. It was therefore fainter than 21st magnitude (the larger the magnitude the fainter a star).

When first seen on Aug. 2 by Dr. V. M. Blanco at Case Institute of Technology, Cleveland, the nova was of 10th magnitude. By Aug. 10 it had dimmed down to magnitude 12, Harvard College Observatory, Cambridge, Mass., reported.

• Science News Letter, 80:167 September 9, 1961

ELECTRONIC FIRE MAP — The newest fire-fighting device is a map that lights up at stations where equipment is in use. The dispatcher can determine what equipment is available and make instant radio contact with stations and individual firemen at the Rochester, N. Y., fire control center, built by General Railway Signal Company of Rochester and Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

TECHNOLOGY

Preserves Perishables

➤ A METHOD of preserving food which will make available fresh fish in areas far from the sea and fresh tropical fruit out of season is close to commercial testing.

Dr. Paul C. Aebersold, director of the office of isotopes development of the United States Atomic Energy Commission, Washington, D. C., told the Tenth Pacific Science Congress in Honolulu that mild doses of radiation can be used to reduce the growth of bacteria for weeks in perishable foods. This promises to compete with canning and frozen food in the near future.

The "low dosage" preservation of food, also known as radiation pasteurization, promises to be particularly important in the event of limited wars in which United States troops may be engaged in the future. Soldiers in the front line areas could be supplied with otherwise perishable foods without refrigeration.

An immediate commercial application is used on strawberries, which can be prevented from molding for weeks by low-level radiation. The radiation is cheaply and simply available from some of the by-products of atomic reactors.

In India tests have shown that the ripening of mangoes can be delayed and this tropical fruit, usually not available to areas without refrigeration, can be made available widely in the future. Since for religious reasons, meat is not widely eaten in India and mangoes have excellent protein and nutrient qualities, this should be a major contribution to the Indian diet.

Another advantage of low dose preservation is that any larvae of dangerous insects would be killed by this method. For that reason fruits that otherwise could not be shipped into areas like the United States would be made safe for marketing.

For radiation pasteurization, a few thousand rads are necessary, which is only about one-tenth to a hundredth of the more massive radiation doses used in the food sterilization that the U. S. Army Quartermaster Corps is investigating. A rad is a unit measuring radiation somewhat similar to roentgens which are used to measure X-ray dosage. A rad produces 100 ergs of radiant energy per gram of the material being irradiated.

The apparatus for irradiating food probably in the future will be used in the food processing plants or even in the fields where the crops are being harvested.

The Atomic Energy Commission is undertaking a five-year study of this new food preservation method and experiments are underway at the Massachusetts Institute of Technology, Cambridge, Mass., at Seattle, and at the University of California Agricultural Experiment Station at Davis.

The low-dosage irradiation supplements the work the U. S. Army Quartermaster Corps is doing at Natick, Mass., on high dosages of radiation capable of completely destroying bacteria, permitting food preservation without refrigeration for many months and years. Although this food sterilization program is progressing more slowly than was expected when it was introduced a few years ago, it is still a major food research project of the Army.

• Science News Letter, 80:168 September 9, 1961

VITAL STATISTICS

U.S. Population Dangers

➤ THE POPULATION explosion in the United States now in progress in the next few years will bring dangerous consequences to which the nation is "blinded by the short-run gains of resurgence in national growth," Prof. Philip M. Hauser, director of the University of Chicago's Population Center, told the Tenth Pacific Science Congress in Honolulu. Following an increase of 75 million persons during the first half of the century, present trends indicate an increase of more than 230 million persons during the second half of this century, an increase which alone surpasses the 179.3 million persons in the United States at the present time.

Prof. Hauser's warning of rapid population growth to the nation included:

1. Inundation of the schools, with a reduction in the quality of education.

2. Slum-like congestion, air pollution, water contamination and shortages, and commuter problems in the metropolitan areas.

3. Chronic unemployment as postwar babies enter the labor force at rates that challenge the capacity of the economy to absorb them.

4. An increase for the first time in United States history of more people to feed than productive workers.

5. Obsolescence of the old forms of local government, intensification of conflict between cities and rural areas, and increased governmental intervention in our way of life.

6. Greater frictions and tensions in urban living brought about by a quickened tempo of social and cultural change.

7. Increased delinquency, crime, drug addiction and divorce, which indicate increased personal and social disorganization.

8. Increased friction between groups in the population, particularly white-Negro relations and a retarding of the effort of the Negro to raise his economic and social status due to the explosive increase of Negro population which exceeds that of the white.

In addition to these short-run dangers, Prof. Hauser sees the prospect in the future of mineral scarcities, water shortages, outdoor recreational facilities shortages, and other unhappy situations.

In the longer run, in less than 800 years, a continuation of present U. S. growth rate would result in there being a person to every square foot of land in the nation. While 800 years is a long time to an individual, it is only an instant in the evolutionary development and a relatively short time in the life of the nation, Prof. Hauser observed.

The United States will have a total population of one billion persons by 2050 if present rates continue. Prof. Hauser declares that the United States cannot safely maintain indefinitely its present national rate of increase, which doubles the population in about every 40 years.

The United States has however, already gone a long way toward controlling its rate of population growth. The birth rate since World War II is only half of the U. S. birth rate in 1800. However, decreases in death rates have been so spectacular that the halving of the birth rate is not enough to prevent continued explosive growth. A further decrease in the birth rate of about 40% would produce a stationary population.

The underdeveloped areas of the world face even more severe consequences since they have yet to begin the process of effective fertility control.

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Insects Kill Weeds

➤ THE INSECT enemies of unwanted weeds are doing an excellent job in clearing areas for agriculture. The U. S. Department of Agriculture is expanding research to release more insect enemies of undesired plants.

James K. Holloway, entomologist in the U. S. Department of Agriculture's Agriculture Research Service, Berkeley, Calif., reported to the Tenth Pacific Science Congress in Honolulu that the insect attack upon weeds began in 1944 when the U. S. Department of Agriculture and the University of California cooperated to import insects to control St.-John's-wort (Klamath weed).

Imported beetles cleared more than a half million weed-infested acres in California and the Northwest. This stimulated attempts to control other weeds with insects.

The gorse seed weevil, *Apion ulicis*, was liberated in 1953-54. It became established and subsequently has become a factor in retarding the spread of furze.

The cinnabar moth, *Tyria jacobaeae*, was introduced in California in 1959 to control tansy ragwort. The moth became established there and in Oregon, where substantial numbers were released the following year, Mr. Holloway said.

In 1960, the twig mining moth, *Leucoptera spartifoliella*, was released in an effort to regulate the growth and retard the spread of Scotch broom. This insect became established, and additional releases were made this year.

• Science News Letter, 80:168 September 9, 1961

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Y8006

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Please check for club listing.

My school is:		My group is from:	
Elementary	☐	Club	☐
Jr. High School	☐	Classes	☐
Sr. High School	☐	Other_____	

Number of club members_____

Science Fair in my school: Yes ☐ No ☐

I read Science News Letter: Yes ☐ No ☐

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Y8006

Science Youth Program

An extensive national and international movement directed by Science Service stimulates and gives scientific experience to the youth of the world.

MORE THAN 700,000 students are members of some 25,000 groups, largely in high schools, affiliated with Science Clubs of America, a Science Service activity. Any adult, whether science teacher or club leader, can affiliate a science class, group or club without charge.

Individual projects and experiments by young scientists are shown in exhibits prepared for the thousands of school science fairs held each spring. The best of the exhibits in high school fairs are selected to compete in more than 200 area and regional fairs which are affiliated with the National Science Fair-International. Each of these fairs sends not more than two of its top exhibitors to the National Science Fair-International, the thirteenth of which will be held in Seattle, Wash., May 2 to 5, 1962. Thousands of professional scientists, engineers and educators advise student scientists on their projects, and panels of these experts serve as judges at local, regional and national fairs.

Science Fair Committees are organized to conduct local and regional science fairs in cooperation with public, private and parochial school systems, colleges, research institutions, industries, professional science, engineering and educational societies, newspapers, civic clubs, museums and other agencies.

The Science Talent Search for the Westinghouse Science Scholarships and Awards, conducted by Science Clubs of America, is the pioneer top-level competition to select from the nation's high school seniors those giving promise of being the creative scientists of tomorrow. Conducted during the fall of 1961 for the 21st time, the Science Talent Search uses a science aptitude test on a nation-wide basis to select 10% of the boys and girls for honors. Forty members of this Honors Group are designated Winners and are invited to Washington for a five-day Institute at which $34,250 in scholarships and awards are given.

Through special arrangement with Science Clubs of America, State Science Talent Searches are conducted in 40 states, usually by academies of science or universities.

Records of achievement of Science Talent Search winners over the years show that 100% go to college and about half of those now old enough have earned their doctorates or are about to do so.

The Science Talent Search is approved by the Committee on National Contests and Activities of the National Association of Secondary-School Principals.

As part of the National Science Youth Program, Science Service develops and distributes experimental kits at low cost, books and pamphlets promoting scientific experimentation; provides basic and background information in all fields of science; cooperates with many organizations in their science youth programs. Support from the National Science Foundation and other groups is obtained to materialize and implement mutual objectives in science education, particularly in secondary schools.

Other major activities of Science Service contribute to the National Science Youth Program. Science Service's service to newspapers, reaching a total circulation of over 10,000,000, informs teen-age science enthusiasts as well as the general public. SCIENCE NEWS LETTER with a growing circulation of over 70,000 reaches a select audience of non-scientists and scientists alike, including a great many students, science teachers, college professors and research scientists. SCIENCE NEWS LETTER regularly carries news of SCA affiliated science clubs.

THINGS of science, experimental kits containing unusual specimens or explaining experimentally processes through which a familiar product passes, have been issued monthly since 1940. Production of these kits has introduced many young people to the joys and techniques of science experimentation. CHEMISTRY, issued monthly during the school year, brings particularly to high school teachers the latest in its important field.

"October—National Science Youth Month" was inaugurated and sponsored by Science Service as a means of catalyzing the beginning of science youth activities during the school year and enlisting the cooperation of diverse organizations engaged in science youth activities.

Science Service, 1719 N Street, N.W., Washington 6, D. C., invites the cooperation of organizations and individuals in extending science youth activities, particularly in regions where science fairs and clubs are not yet developed.

Information and suggestions will be furnished upon inquiry to Science Service.

Science Clubs of America

Active groups of young scientists, guided by sponsors to creative experiment, find that "science is fun." Today's youth are tomorrow's scientists.

APPROXIMATELY 25,000 science groups are affiliated with Science Clubs of America. A current evaluation shows that there are active science clubs at all grade levels, although the largest number are organized on a school-wide basis in senior high schools.

The school clubs plan their activities mainly around biology, chemistry, physics, astronomy, general science, mathematics or some combination of these.

Science club membership averages 22 members, but it ranges from a somewhat exclusive-sounding roster of three members to one all-out activity involving 750 students.

Clubs are sponsored by teachers of every science subject in the curriculum. Most of the teacher sponsors are drawn from the science faculty, but some teach other subjects. General science teachers lead the list with 45%. More than 36% of the sponsors are chemistry teachers.

Clubs also are sponsored by a great variety of people who are entirely outside of the teaching profession. A random sampling turns up an accountant, a Cub Scout den mother, a dentist, an executive of a scientific supply company, a former National Science Fair finalist and a veterinarian.

About 65% of the clubs report that their members are active in science fairs. Many clubs are chiefly responsible for organizing and conducting their school fairs. Others act as student committees for the large regional science fairs in their areas.

In preparation for annual fairs, science clubs frequently program project workshops and seminars where former science fair winners and professional scientists offer suggestions on project ideas and exhibit techniques. Color slides and movies of the projects at the National Science Fair-International are shown by many clubs as a source of ideas and a dramatic set of competitive standards.

Some of the great assortment of specialized activities reported by science clubs are photography, geology, medicine, conservation, nuclear science, aeronautics, paleontology, rocketry, civil defense, meteorology, junior museum work, soil sampling, science publications, model building, pet care, mechanics and studies of scientific careers.

Most club programs and activities are planned and carried out by club members, with the sponsor acting in an advisory capacity. Such a plan allows ample scope for the development of leadership, responsibility, initiative and creative ideas among the student members. The sponsor often is able to act as liaison between the students and community organizations, school administrators, scholarship foundations, scientific libraries and professional societies. In many cases the sponsor supervises group or individual laboratory experiments.

Affiliating a club with Science Clubs of America is a very simple procedure. All that is required is a note from the sponsor indicating the club's desire to join and to receive materials and information without charge. The Sponsor Handbook, supplied free to sponsors, is revised annually to provide the latest and most complete information on activities for science-minded young people.

Fairs: National—Local

Science Fairs show graphically and effectively the magnitude of creativeness and scientific enterprise of which young scientists are capable.

THE NATIONAL SCIENCE FAIR-INTERNATIONAL has developed to its present size and scope from a beginning of 13 affiliated area fairs in 1950. Even more spectacular is the expansion of the science fair program at local and regional levels. Feeding these, or operating independently, are school fairs which have become so numerous that it is difficult to keep track of them.

A science fair is a collection of exhibits, each of which is designed to show a biological, chemical, physical or technical principle, a laboratory or other procedure, an industrial development, or an orderly collection of anything which can be fitted into the broad concept of any branch of any pure or applied science.

Every year millions of people see science exhibits shown by students at science fairs leading to the national fair.

One reason for this growing student interest in science and technology during the past decade is the exciting advance which science has made and is projecting.

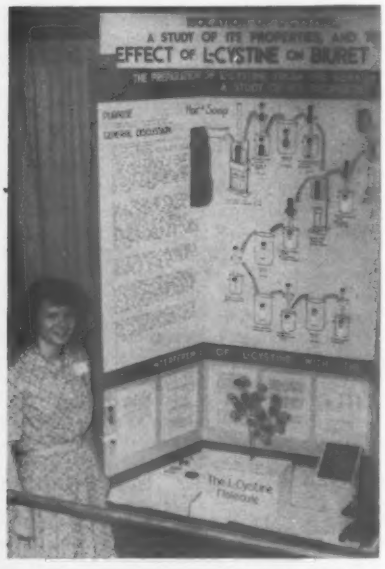
Coupled with this is the awareness of educators, from kindergarten through university, that genuine interest in science is sparked at a very early age, often before the first year of school.

Scientific and technical societies, cognizant of the tremendous shortage of skilled scientists and technicians, are encouraging science fair programs for the purpose of recognizing potentials early and because through them additional motivation becomes more easily possible.

Civic and social groups find that science fairs supply an outlet for constructive creativity of youngsters. The fairs provide a purposeful use for funds accumulated in educational and other accounts.

Newspapers sense the rich educational service which fairs give to the community. They often sponsor the program and take over, or assist, in the promotion, arrangements and financing.

Industry sees the science fair as an exemplification of the American way of free enterprise. It lends technical experts to the cause and helps to finance it.



Joyce Lea Yucker, 17, NSF-I Finalist from Northwestern New Mexico Regional Science Fair. Project: L-Cystine Preparation and Properties.

School Fairs

The simplest fair is an exhibition of science projects held in the school itself. There are shown all the experiments, collections and displays that have been worked out by students either in class or as extra-curricular science club activities. These fairs often are a feature of a meeting or a showing to which the public is invited.

City-Wide, Area or Regional Fairs

These large science fairs may have several hundred exhibits, viewed by thousands of people who visit an exhibition hall which may be a school or college gymnasium, an armory, a museum or other such area. Some science fairs, even in large cities, accept the maximum number of exhibits the hall will allow. In other cases, the city or area fair receives only an alloted number of exhibits from each school, which holds its own eliminations first.

Exhibitors in such fairs are rewarded by the stimulation of having their work shown and by receiving certificates of merit. Other awards, ranging from emblems to cash prizes and scholarships, may be given.

National Science Fair-International

From regional or state fairs the best exhibits made by individual students (not groups) are selected for entry into the annual National Science Fair-International.

The rules of the national fair specify that to be eligible boys and girls must be students in the last three years of public, private, parochial or other secondary schools, and must have been selected for highest honors in a regional fair affiliated with the national organization.

Each affiliated fair is entitled to send two finalists and their exhibits to the national fair, paying their expenses and undertaking responsibility for them.

All exhibits must be individual projects and must be limited in size to 48 inches from side to side and 30 inches from front to back. Identical repetition of a project exhibited by the student at a previous year's science fair disqualifies the finalist. However, the project may cover the same field of investigation when a substantial amount of continued and expanded work has been done.

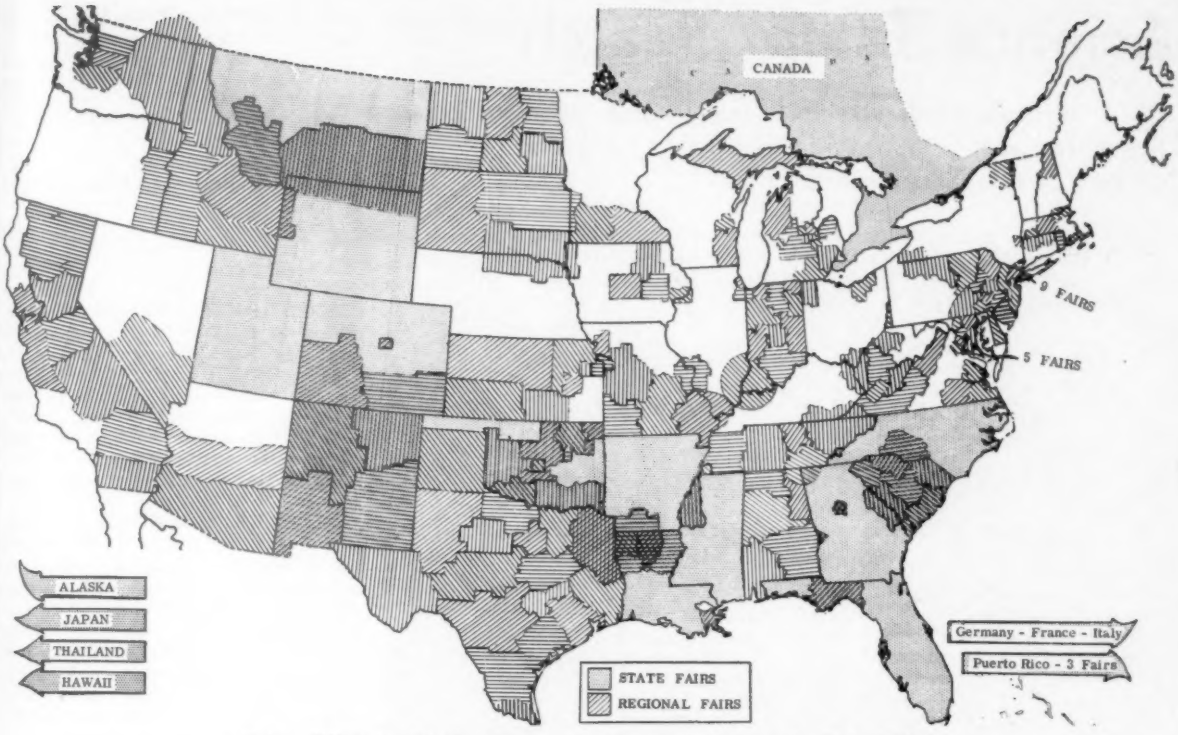
Exhibits must be durable and safely designed and constructed, using approved switches and cords for 110-volt operation. No dangerous chemicals, open flames, explosives or live poisonous reptiles may be exhibited. Live animals must be properly and humanely cared for, and any experimental work that has been done with them must conform with National Science Fair-International regulations for such experiments. Plants must pass federal and state quarantine regulations.

Honors and Awards

For National Science Fair-International Awards, exhibits are judged in the two general categories of biological and physical sciences, subdivided respectively into a number of sections. The projects of boy and girl finalists are judged separately. First, second, third and fourth place awards are made in these respective sections. In sections where there are not sufficient entries to sustain judging, sections may be combined.

Each finalist receives a rainbow-ribboned gold and silver medal engraved with his or her name and that of the cooperating organization. A replica medal on a certificate is sent to the principal of the school of each finalist to become a trophy in the school.

Christopher George Cherniak, 16, NSF-I Finalist from the Florida State Science Fair. Project: Development and Use of Tissue Culture of Functioning Single Neurons.



Fairs affiliated with the National Science Fair-International in 1961.

On the basis of critical judging outstanding finalists are given "Wish Awards"—selected scientific equipment and materials which winners have "wished for" to help them in the furtherance of their study and experimentation.

Special awards are made at the National Science Fair-International by the American Chemical Society, American Dental Association, American Institute of Biological Sciences, American Medical Association, American Pharmaceutical Association, American Society for Microbiology, American Veterinary Medical Association, National Aeronautics and Space Administration, National Pest Control Association, Optical Society of America, Pathology-Medical Technology, U.S. Air Force and Space Education Foundation, U. S. Army, and the U. S. Navy.

Judging is based on creative ability, scientific thought, thoroughness, skill, clarity and dramatic value of each exhibit. Scientists designated by Science Service judge the contest and the decision of these judges is final in all cases.

While every effort is made to prevent damage to exhibits, neither the National Science Fair-International, Science Service, the Committee of the host city nor any other sponsoring organization can assume responsibility for loss or damage.

All finalists participate in a four-day program of scientific sightseeing and meetings with leading scientists as well as the public. At the same time they become acquainted with other finalists having similar interests, compare their work and carry back to their local situations an enthusiasm and stimulation that will be reflected by others in future years.

Educationally Valuable

The whole science program is educationally sound. It allows the student to select freely the project upon which he plans to work. Automatically he leads himself through a study of the bedrock principles of his chosen topic, thus acquiring a basic, fundamental understanding of the facts and techniques involved. All elements of a stiff competition are present to urge the student to do his best, thus reflecting honors on himself, sponsors, school, city and state.

Educators and newsmen cooperating in the program of the National Science Fair-International plan the fair in a different city each year. This makes it possible for a finalist, who returns to the fair each year he is eligible, to visit three different cities, meet the outstanding scientists in each and visit them in their laboratories. Similar cultural values automatically extend to the accompanying educators and press representatives.

Regional or School Fair Rules

Regional and school science fairs generally use the rules of the national fair or adapt them to fit various local situations.

Depending on local rules, students may work individually or in groups. Exhibits must be designed and made by students. They may seek help from educators and others. Each exhibit should be so arranged that it can be understood by the layman without requiring an accompanying demonstration or lecture. Judgment of exhibits is based on work done by students, not on cost of accessory or incidental equipment.

How to Conduct a Science Fair

The science club sponsor or teacher, or group of sponsors or teachers, first should get permission from the principal or board of education for holding a science fair to which parents and the public will be invited.

The fair may be designed for operation in one school, or each school of a group of schools can schedule the event to occur substantially at the same time. The best exhibits may then be presented at a final centralized place.

Additional information on conducting and organizing a science fair will be sent without charge or obligation to anyone requesting it. Write to Science Service.

How to Enter the National Science Fair-International

Entry to the National Science Fair-International of exhibits and the students who made them is possible only through a regional, district or state fair which is affiliated in the national fair program. Affiliation requires signing a contract with the national organization, the payment of an entry fee, and assurance that the finalists will be properly selected and sent, all expenses paid, to the National Science Fair-International, together with their exhibits. No more than two finalists may be chosen for any one cooperating fair.

Science Talent Search

Science-minded seniors are offered unusual opportunity for recognition and scholarship assistance toward careers in scientific research.

MANY STUDENTS in junior high school and the early years of senior high school look forward to and prepare for entering the Science Talent Search for the Westinghouse Science Scholarships and Awards when they reach their senior year of high school. This competition discovers, with essential educational cooperation, the youth of America whose scientific skill, talent and ability indicate potential creative originality. Science club and science fair activities have proved to be excellent preparation and background for success in this scholarship competition.

The Science Talent Search is conducted annually by Science Clubs of America as an activity of Science Service in cooperation with the Westinghouse Educational Foundation. It is open to boys and girls who are seniors in public, private or parochial schools in the United States, but excluding U. S. possessions, who are expected by the certifying school officials to complete college entrance qualifications before the following October. Students must not have competed in any previous Science Talent Search.

Each year an Honors Group of approximately ten percent of the fully qualified entrants is chosen for special recognition. Members of the Honors Group receive certificates and recommendations to the colleges and universities of their choice. These recommendations usually result in acceptance of the students for admission as well as scholarships and other financial assistance offered by colleges and universities seeking students of unusual promise in science.

From the Honors Group, the top 40 winners of the Science Talent Search are chosen. These winners are invited to attend the Science Talent Institute held for five days each spring in Washington, D. C., with all arranged expenses paid. During the Institute they are judged for five scholarships of $7,500, $6,000, $5,000, $4,000 and $3,000, and 35 Awards of $250 each.

Each winner receives a bronze Science Talent Search Plaque to be presented to the permanent honors and trophy collection of the winner's school.

Each member of the Honors Group receives a Science Talent Search Certificate signifying the honor. The Certificate, suitable for framing, is sent to the school for presentation to the student. It becomes his or her property.

Committees of judges designated by Science Service judge the contest, and the decision of these judges is final in all cases.

A scholarship may be applied toward a course in science or engineering at a college or university chosen by the winner and approved by a scholarship committee named by Science Service. Science and engineering courses must be within the fields of activity of the National Academy of Sciences and the National Research Council. If a scholarship winner withdraws from college, or if the Scholarship Committee disapproves further use of the scholarship because of reports from the college of unsatisfactory progress, any further benefits from the scholarship are forfeited.

Entering the Science Talent Search

To enter the Science Talent Search the senior takes the science aptitude examination in his own school under the supervision of his sponsor, teacher or other authorized school official. Such persons also verify the personal data form submitted by the student and see that the scholastic record is transmitted. The student writes a report of about 1,000 words on "My Scientific Project." This should involve original work. Entrants should develop a project that is planned for the Search or adapt to the Search something they already are doing.

Science teachers and school officials qualified to administer the examination may request entry materials for any number of eligible students. Entry blanks are mailed from Washington about Nov. 15. The examinations must be administered early in December.

All entries in the Annual Science Talent Search must reach headquarters of Science Clubs of America in Washington, D. C., by midnight, Dec. 27.

Girls as well as boys are encouraged to enter the Science Talent Search. The number of girls chosen for honors is determined by the proportion of girls who complete entries.

Search Winners Succeed

One of the most frequent questions asked is, "Do Science Talent Search winners really become successful scientists?"

The winners all have attended or are attending college. With rare exceptions they proceed to bachelors' and about 50% of those who have had time have doctors' degrees. The education of these winners has been supported liberally by scholarships and fellowships. Advanced study on fellowships takes many of them abroad.

Membership in such honorary fraternities as Tau Beta Pi, Phi Beta Kappa and Sigma Xi is so frequent as to be almost standard.

Publication of their work in various scientific journals increases as they proceed with education and research.

Almost every known science has at least one winner specialist. Physics has attracted the largest number. A very small minority choose non-science fields for their careers.

The largest group prefers academic research and teaching. As professors they often have more recent winners in their classes or working as their research assistants.

The second largest number now working full time is in industry. Research is the most frequent assignment but a few are in sales, production or administration.

Offers of summer employment in research laboratories come to all 40 as soon as they are named winners.

The 40 Science Talent Search winners visited President John F. Kennedy during the 20th Science Talent Institute in Washington, D. C.

Almost all earlier winners have served in the armed forces but later ones, in general, have been deferred until their education is completed.

Most of the older winners are married and many have four or five children. Science Talent Search women tend to marry scientists and engineers of comparable training or more. The men do not so frequently choose mates in those fields but all have college-trained wives, frequently with degrees to match their own.

All women have worked before marriage; many afterward. Those retired to care for their children express the desire to resume their careers later. Meanwhile they keep up their science themselves and through their husbands' work.

By entering the national Science Talent Search, students automatically enter a state search, if one is held in their state, at the close of the national competition.

Science Talent Search Aids

Back issues of Science Talent Search science aptitude examinations and answers are available as long as the supply lasts. Specify the year desired. The price is 15c per copy, answers and passing scores included.

Send 50c to cover postage and packing of a bundle of four different past Science Talent Search booklets containing abstracts of winners' papers and other information.

Joshua Wallman, 17, top STS scholarship winners from New York City, conducted experiments in animal behavior for his Talent Search project.

Mary Sue Wilson, 17, STS winner from Cedar Falls, Iowa, chose the field of biochemistry for her project.

How to Do a Science Project

Read widely—Your success with science projects depends largely on how much you know about your subject. Wide reading broadens your understanding of the possibilities and limitations of your project. Search your school, public, and nearby university, college and specialized libraries for publications in your project field. Librarians are most willing to help you.

Question others—Scientists draw heavily upon the knowledge of others in their own and related fields. Acquire the habit of consulting with others about your plans. Often a classmate or an adult can point out an error in your thinking or suggest a method which might take you many hours to detect otherwise.

Professional scientists and technicians are always glad to help answer your questions if you follow simple rules of courtesy such as querying them when they have time to answer and questioning them only when you have done enough reading and thinking to be able to ask intelligent questions. If you do not abuse their kindness you may, like other young scientists, find adults eager to lend you not only suggestions, but also equipment, books, publications, etc., that you might not otherwise be able to secure.

It even helps to talk over your project with an intelligent person who knows nothing about your work. In attempting to explain it to him you will be forced to clear your own thinking and his questions may point out areas that need more attention for the sake of clarity.

Plan carefully—Scientists save much time and money by planning so thoroughly that the actual experimenting goes through with a minimum of failure. Try to anticipate the difficulties you will encounter and forestall as many as possible by deliberate planning.

Set up effective controls and keep complete records of all your work, both successful and apparently unsuccessful.

And some don'ts—

Don't write some organization to send you everything it has on the subject, or expect the staff to do your project for you.

Don't tackle such a large project that you have time only to build the instrument you plan to use. If you must build an instrument that you have not tried to build before, better limit your project to that, and present a completed job.

Don't become discouraged. See your project through to a logical stopping point.

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SPACE

A-Power for Moon Trip

➤ CHEMICALLY powered rocket engines to be developed for a manned flight to the moon will be designed so that nuclear engines could be substituted, at least in the vehicle's upper stages, the head of the National Aeronautics and Space Administration told a joint House-Senate atomic energy subcommittee.

NASA Administrator James E. Webb said that planning for the lunar flight is built around chemical fuels, rather than nuclear power, because "no one could be sure that technology would advance rapidly enough" to make nuclear rocket propulsion feasible by that time. But in effect, the door will be left open, just in case.

Reporting progress on Project Rover, the joint NASA-Atomic Energy Commission nuclear rocket program, Mr. Webb said that adding nuclear rocket stages to moon-bound vehicles would result in "performance gains" and "large payloads."

Nuclear rockets are primarily intended, however, for missions beyond the moon and the heavy payloads required "to support lunar bases and for manned exploration of the planets. Nuclear energy is essential for such missions," he said.

The program has AEC in charge of the initial reactor phase and NASA in charge of the engine and vehicle phase. Flight tests for a nuclear-powered space vehicle are not expected before 1966 or 1967.

"We hope they will be the first in the world," Mr. Webb said.

Dr. Glenn T. Seaborg, AEC chairman, said the success of the program is not yet assured. But he also thought there was a chance of getting a nuclear-powered engine in time for use in "the upper stages of a manned mission to the moon."

Upcoming ground tests for reactors using gaseous hydrogen and liquid hydrogen as fuels will do much to determine the feasibility of the nuclear concept, he added.

Project Rover is budgeted at $89,500,000 for the current fiscal year. Total expenditures may reach as much as $1 billion before a successfully functioning engine is evolved, the subcommittee was told.

• Science News Letter, 80:177 September 9, 1961

TECHNOLOGY

Can Talk to Computer

➤ THE SAME WORDS that one engineer would use to describe the solution of a problem to another engineer now can be used to give instructions to digital computers. The machine will understand such words as inverse, adjust, intersect, ramp, area and alignment.

Prof. C. L. Miller of the Massachusetts Institute of Technology described the system of doing this to the American Association of State Highway Officials in Cambridge, Mass. His system is called COGO, for co-ordinate geometry. It is expected to increase civil engineers' use of computers.

COGO already is in daily use in the MIT Engineering Systems Laboratory that Prof. Miller directs, and has made it feasible to give students full-scale engineering problems as homework assignments. It also is being employed in the Puerto Rico Department of Public Works and will soon be used with a new engineering computer that the Massachusetts Department of Public Works is installing.

The primitive or pseudo languages previously used to instruct machines made their use time-consuming and costly for problems that are rarely exactly alike. With COGO, it is technically and economically feasible to write a separate program for each set of data, use the program once and discard it.

Prof. Miller considers it one step in the development of a much larger system. The Civil Engineering Systems Laboratory is interested in attaching a drafting machine to a computer, and COGO can be expanded to include the words an engineer would use to communicate with a draftsman. Thus engineers ultimately may be freed from such routine chores and enabled to devote more of their time to the creative work for which they are professionally trained.

• Science News Letter, 80:177 September 9, 1961

SPACE

"Astromech" Orbits Soon

➤ AN "ASTROMECH," or mechanical crewman, that will "breathe" and give off heat and moisture, much as a human would, is scheduled to take a space trip around the earth very shortly.

The flight will be a severe test of the Mercury capsule and its instrument systems, since they will undergo nearly two hours of flight and a re-entry period of six to seven minutes, or eight times more than during earlier flights. A flatter and longer re-entry angle into the earth's atmosphere is necessary to bring a craft back from orbital flight compared with sub-orbital flight. During time of re-entry the space capsule will withstand temperatures of up to 2,000 degrees Fahrenheit.

The Atlas rocket's ability to release the spacecraft at the speed, altitude and flight path angle for orbital flight also will be tested, the National Aeronautics and Space Administration reported. The orbital flight, if successful, will check the ability of the braking rocket system to bring the craft down from orbit. Mercury tracking stations scattered all over the world will track it.

The spacecraft will have a complete life support system capable of maintaining a man in space and all the equipment necessary to circle the earth on automatic control. In addition, electronic equipment and sensing devices have been installed to try to duplicate the human brain's ability to make judgments and corrections for errors.

Other mechanical devices will try to duplicate man's actions in space. Since the "astromech" cannot see, a special color camera will point out one of the two portholes to "see" the view. Another camera will "look" through the pilot's periscope and a third will record instrument panel readings. A tape recorder located where the pilot's head would be will record sounds during the flight.

The capsule is scheduled to go into orbit when 100 miles up traveling at about 17,400 miles per hour. Its highest point will be 154 miles. It is expected to land in the Atlantic Ocean 200 miles east of Bermuda. During re-entry between 46 and 12 miles altitude, the speed of the capsule will be slowed down from 17,000 to 1,350 miles per hour.

• Science News Letter, 80:177 September 9, 1961

GENERAL SCIENCE

Applied Research Opens New Roads to Basic Facts

➤ ADVANCES in applied science can sometimes be of great benefit to the pure scientist and open up new fields of research, a reverse of the normal trend of development, Prof. D. J. E. Ingram, physicist of University College of North Staffordshire, told the British Association for the Advancement of Science meeting in Norwich, England.

All the war-time research in radar has now been used by scientists to study the fundamental properties of matter, he cited as an example.

Microwaves have found application in two major fields, diagnostic and therapeutic medicine and detection of gases in industrial plants, Dr. J. Thomson, director of the British Scientific Instrument Research Association, told the BAAS. The medical use depends upon the dielectric factor and the loss of microwave intensity in human tissue. Gases can be detected by the absorption of microwaves by their molecules.

Use of molecules in the direct amplification of radio waves, as in the relatively new device, the maser, allows the reception of signals from outer space that are too weak to be detected by the conventional use of electronic circuits, Dr. O. S. Heavens, reader in experimental physics, Royal Holloway College, told the meeting. Now that the maser has been made to work for light, Dr. Heavens predicted highly directional light sources of high intensity would find new and important uses in the future.

• Science News Letter, 80:177 September 9, 1961

CONSERVATION

Pesticides—Friend and Foe

Wide-scale use of pesticides to control insect damage also has a harmful effect on fish and wildlife. Better control methods are needed, Vincent Marteka reports.

See Front Cover

➤ PESTICIDES, the same beneficial chemicals used to spray farm crops, shade trees and mosquito-infested swamps, are also poisoning birds, fish and other wildlife.

The increasing use of highly toxic pesticides during the last 15 years has reduced the number of robins and other song birds in some states while killing off many fish in other states. Birds traveling along their migratory routes are also picking up dangerous amounts of insecticides from eating poisoned insects.

Scientists in various fields have recently banded together in an effort to work out a solution.

Since World War II when DDT was first developed, new pesticides, many not thoroughly tested, have flooded the market. More than one billion pounds of pesticides were produced in 1960. The value of pesticides sold in 1975 is expected to top $2 billion.

In the United States alone, nearly 100,000,000 acres of forests, fields and swamps were treated with pesticides in 1958.

The big battle against insects began long before man arrived armed with his chemical sprays. During the course of evolution, plants developed defense mechanisms against the insects and the diseases they carry. Birds also played a large role in keeping down the hordes of insects.

When the first white man came to North America, the Indians were living in a relatively stable environment. Although the white man did not fully escape the attacks from insects, enough land seemingly was available for both insects and farmers.

Upset Nature's Balance

As pioneer farmers cleared the forests and planted crops, they unknowingly upset nature's balance, and uprooted forest pests turned to the farmers' fields and multiplied. As urban populations increased and a more discriminating public wanted higher quality food, better methods had to be found to protect crops from pest destruction.

Earlier methods of natural or "biological control" gave way to chemical control, reaching a peak during World War II with the development of DDT.

Scientists have determined that insecticides are more dangerous than any other type of pesticide, where wildlife is concerned. Extensive spraying with highly toxic insecticides succeeds in ridding the forests and fields of insects. But these same poisoned insects, a major source of food for many kinds of wildlife, also frequently kill the creatures who eat them.

The newer insecticides are divided into two groups: the chlorinated hydrocarbons and the organic phosphates. The first group includes the well-known DDT, and heptachlor, dieldrin and endrin. These highly toxic pesticides kill many different kinds of insects and other forms of life. The chlorinated hydrocarbons remain poisonous for considerable lengths of time.

The organic phosphates, closely related to the infamous "war gases," also contain some chemicals harmful to wildlife, but they generally lose their strength quickly. Malathion, a typical organic phosphate, is used to spray pine woods by plane in California as seen on the cover of this week's SCIENCE NEWS LETTER.

The most heavily sprayed areas in the United States are probably the northern forests and the agricultural lands in the South. Outbreaks of tree-destroying gypsy moths and spruce budworms have kept sprayers busy in the North, whereas the fire ant, imported into the country nearly 40 years ago, has now spread over 20,000,000 acres in the South.

Control programs against Dutch elm disease and mosquitoes are also conducted on a fairly large scale in many parts of the nation.

Effects of Pesticides Vary

Wildlife studies show that the effects of pesticides vary with each animal. U. S. Fish and Wildlife expert, Dr. John L. George, said that fish and other water-loving animals are generally more sensitive to pesticides than birds and mammals. Nine out of ten young Atlantic salmon were recently killed in the Canadian Miramichi River after a nearby forest was drenched with pesticides.

At the U. S. Fish and Wildlife Patuxent Research Center, Laurel, Md., birds fed heavy dosages of chlorinated hydrocarbons were seen running around in circles shaking and losing all sense of balance. Some soon died.

The insecticides attack the nervous system, causing the animal to lose all muscular control. If enough poison is absorbed, death follows.

Although large animal kills are frequent and spectacular, scientists are now more concerned with the chronic or lingering effects of the new pesticides. Waterfowl and other migratory birds, hatched and raised in the North far from areas sprayed with pesticides, have been discovered carrying pesticides in their tissues.

Heptachlor was found in a woodcock six months after the game bird left his heavily-sprayed winter home in southern United States. Other cases of crippled young, higher mortality rates, and fewer offspring have also been reported.

The accumulation of poisons in wild creatures is only one facet of a very complex problem. Many insects are showing a growing resistance to the chemical sprays, whereas the usefulness of spraying diseased elms is now being questioned in some quarters.

Yet, pesticides play an important role in providing the nation's food supply and protecting the public health. The world-wide use of DDT alone has literally spared millions of lives while hundreds of millions have escaped diseases without one known human case of serious poisoning.

The National Academy of Sciences-National Research Council, realizing the controversial nature of the problem, has created a special committee to work out a sound program for effective plant protection without causing permanent damage to useful animals. An international committee of European and American scientists has also been organized to attack the problem afflicting both sides of the Atlantic.

Better Control Methods Needed

Possible avenues of research include developing better control methods and more select poisons that would kill the pest without harming other creatures. One such new chemical, sevin, may soon replace DDT, which has hit hard at the animal world.

The public must also be instructed in properly applying pesticides and warned of the dangers of misuse. Many farmers and householders indiscriminately spray the new potent chemicals with little thought to the harmful effect on wildlife caused by the build-up of poisons in the soil, or to the possible poisoning of the animal's drinking water.

The public should be taught to avoid spraying near water and using too much poison. Whenever possible, chemicals should not be applied during nesting season, experts advise.

• Science News Letter, 80:178 September 9, 1961

NUTRITION

Food From Groundnuts Developed in India

➤ SCIENTISTS IN INDIA have developed two new food products using native groundnuts, similar to the American peanut, the National Science Foundation reports.

In the first, an enriched macaroni was made from a blend of groundnut flour, tapioca flour, medium-grade wheat particles (semolina) and casein, a protein produced from curdled milk. The macaroni has a protein content of 16% to 19%.

In the second, a dried milk substitute was made from groundnut milk and soybeans. The work was done at the Central Food Technology Research Institute at Mysore.

• Science News Letter, 80:178 September 9, 1961

MEDICINE

Measles Vaccine Tested

▶ THE LIVE measles virus vaccine has passed another field test, scientists report in the Journal of the American Medical Association, 177:537, 1961.

To date, no one exposed to measles after vaccination has come down with the disease.

Children who have never had measles usually have a fever after receiving the vaccine, and about half get a rash. Most of the reactions, however, are not severe enough to send the child to bed. Of the 103 children studied in the current test, 10 had to go to bed, and they were as ill as one would be with a mild case of measles.

Drs. Samuel Karelitz, Franklin Desposito, Stanley Gittelson, Herbert Goldman, Avron Ross, Floyd S. Markham, James M. Ruegsegger and Herald R. Cox of the Long Island Jewish Hospital in New Hyde Park, N. Y., and Lederle Laboratories, Pearl River, N. Y., report that fevers were most frequently between 101 and 103 degrees Fahrenheit. In some cases the mercury went as high as 106 degrees.

Unlike the child with a full blown case of measles, the child who gets the mild measles after vaccination does not spread it to others.

The Journal points out editorially (p. 569) that a study of vaccination with killed measles virus vaccine followed by inoculation of live virus vaccine is now in progress. If successful, this may be a way to reduce or eliminate the reactions to the live vaccine.

"Instead of a minimum of 8,000,000 days of illness which results from measles in 1,000,000 patients a year in the United States, it now seems possible to lower the morbidity to less than 3,000,000 days and to reduce the severity of this illness very significantly. Most of the vaccinated children do not feel very ill, they do not spread the disease, and, hopefully, they will have the same immunity which follows ordinary measles," the editorial states.

• Science News Letter, 80:179 September 9, 1961

INVENTION

Patents of the Week

A mask for communication in noisy jet planes, a convertible bicycle, a gamma ray projector for subsurface examination of metals and garterless stockings have been patented.

▶ JET AIRPLANE ENGINES, given preflight tests at full power, make so much noise that the pilot in the cockpit and the man in charge on the ground have had to resort to hand signals to communicate with each other.

To remedy this, inventor Alfred D. Traller, Seattle, Wash., came up with an acoustically insulated microphone mask permitting ready oral communication "at all times regardless of engine noise." He assigned rights to patent No. 2,997,550 to Boeing Airplane Company, Seattle.

The sponge rubber inner shell of the two-piece mask, holding the microphone socket, contains a pair of irregular, "meandering" air passages that deaden the sound by forcing it along a twisting path after it comes in through openings on the outer shell. At the same time the ducts make voice communication still clearer by checking the build-up of air pressure on the microphone.

In use, the two pieces fit closely together and can be held in place with one hand. The outer section is also of sponge rubber, but coated with an external resinous "skin." The inner section fits closely over the face, with the muffling passages running from the chin up over the cheek bones.

A bicycle that converts easily from a boy's model to a girl's model, or vice versa, won patent No. 2,997,308 for Alban M. Boudreau, Gardner, Mass. An adjustable curved cross-bar, raised or lowered and held in one of the two positions by a bolt, makes this possible. Rights were assigned to Hedstrom Union Company, Fitchburg, Mass. A gamma ray projector for subsurface examination of metals, using radioactive isotopes as the ray source, was awarded patent No. 2,997,592. Inventor Robert B. Costello, Rahway, N. J., assigned rights to the M. W. Kellog Company, Jersey City, N. J.

Mr. Costello points out that nuclear reactors, producing isotopes artifically, have made gamma ray sources cheaper than X-ray sources. X-ray projectors have the added disadvantage of requiring a "large amount of bulky and expensive electrical equipment."

In the smallest model described, Mr. Costello's gamma ray device weighs about 50 pounds and can be hand-carried. When not in use, the radiation source stays entirely inside a rotary positioning section made of lead shielding. The radiographer must take precautions only against "scattered radiations of low penetrating effect" during the actual shot, and is "completely safe" at all other times, according to the inventor.

A type of self-sustaining or garterless stocking, its upper portion designed not to roll down beyond a predetermined point, won patent No. 2,996,726 for Nathan Mayer, Yonkers, N. Y. Rights were assigned to Prestige, Inc., New York.

The stocking is held in place by a narrow band of latex, casein, or a mixture of both, coated inside the fabric at the upper end of the knee portion.

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ADAPTATION—Bruce Wallace and Adrian M. Srb—*Prentice-Hall,* 113 p., illus., $2.95; paper, $1.50. Foundations of Modern Biology series.

THE ADOLESCENT SOCIETY: The Social Life of the Teenager and Its Impact on Education—James S. Coleman with John W. C. Johnstone and Kurt Jonassohn—*Free Press,* 368 p., diagrams, $6.95. Author analyzes the social systems of ten high schools of widely varied communities.

ANIMAL DIVERSITY—Earl D. Hanson—*Prentice-Hall,* 116 p., illus., $2.95; paper, $1.50. Strives to give student and general reader a broad perspective of our present knowledge.

ANIMAL DUNKIRK: The Story of Lake Kariba and "Operation Noah," the Greatest Animal Rescue Since the Ark—Eric Robins and Ronald Legge—*Taplinger,* 188 p., photographs. $4.50. Tells of the courageous game rangers who rescued animals from the rising waters behind the Kariba dam in Rhodesia.

ATLAS OF THE UNIVERSE—Br. Ernst and Tj. E. De Vries, transl. from Dutch by D. R. Welsh; H. E. Butler, Ed.; preface by H. A. Bruck—*Nelson,* 227 p., illus., $9.95. Written by non-specialists for non-specialists, edited by astronomer, offers concise encyclopedia with many photographs and diagrams.

BASIC CONCEPTS OF PHYSICS—Chalmers W. Sherwin—*Holt,* 410 p., diagrams, $6.50. Unified treatment of the five basic theories of physics at undergraduate level, only prerequisite is introductory calculus.

BRAZIL: The Infinite Country—William Lyttle Schurz—*Dutton,* 346 p., maps, $6. Up-to-date survey of the largest country in the Western Hemisphere, its people and development, viewed by a historian.

CAMPANULAS AND BELLFLOWERS IN CULTIVATION—H. Clifford Crook—*Blandford (St. Martins),* 90 p., photographs, $2.50. Introduces the general gardener to species most suitable for cultivation in borders, on rocks, under cover and in the wild garden.

THE CHALLENGE OF THE SPACESHIP—Arthur C. Clarke—*Ballantine Bks,* 189 p., paper, 50¢. Speculates on some of the technical developments we might expect in the age of manned space flight.

CIVIL AIR REGULATIONS AND FLIGHT STANDARDS FOR PILOTS—Aeronautical Staff—*Aero Pubs.,* 23rd ed., illus., $4.50; paper, $3.00. Up-to-date manual for pilots.

COFFEE: Botany, Cultivation and Utilization—Frederick L. Wellman—*Interscience,* 488 p., illus., $13. Monograph covering all aspects of coffee, from early history, soils, climates, genetics, plantation planning, cultivation, to diseases, harvesting, processing and quality testing.

COMBUSTION, FLAMES AND EXPLOSIONS OF GASES—Bernard Lewis and Guenther von Elbe—*Academic Press,* 2nd ed.. 731 p., illus., $22. Presents advances in combustion research with major revisions in the subjects of combustion waves and of detonation processes.

THE EFFECTIVENESS OF FILMED SCIENCE COURSES IN PUBLIC SECONDARY SCHOOLS—W. James Popham and Joseph M. Sadnavitch—*Dept. of Educ. & Psychology, Kansas State College of Pittsburgh,* 66 p., tables, single copies free upon request direct to publisher, Pittsburgh, Kans. Describes experiment designed to evaluate the filmed physics and chemistry courses introduced in southeast Kansas schools.

THE EVOLUTION OF MAN: A Brief Introduction to Physical Anthropology—Gabriel Ward Lasker—*Holt,* 239 p., illus., $3.50. Presents in outline physical anthropology as an integrated field for the study of primates, fossil man, human genetics, blood groups and growth patterns.

EXPERIMENTAL CHEMISTRY—Michell J. Sienko and Robert A. Plane—*McGraw,* 2nd ed., 271 p., illus., paper, $3.50. Laboratory manual emphasizing the distinction between observation and interpretation of facts observed.

FREUD AND PSYCHOANALYSIS—C. G. Jung, transl. by R. F. C. Hull—*Pantheon Bks,* 376 p., $5. Gives the substance of Jung's published writings on Freud and psychoanalysis between 1906 and 1916, with two later papers.

THE FUTURE OF OUR CITIES—Robert A. Futterman—*Doubleday,* 360 p.. maps, $4.95. Analyzes the elements that affect changes in urban patterns and discusses the prospects of 17 individual metropolitan areas.

GAMES OF STRATEGY: Theory and Application—Melvin Dresher—*Prentice-Hall,* 184 p., $9. Develops fully the mathematical theory of games of strategy and explores their application to a variety of decision problems.

GEOMETRIC INEQUALITIES—Nicholas D. Kazarinoff—*Random House,* 132 p., illus., paper, $1.95. Simply stated geometric problems about maximum and minimum lengths and areas, book grew out of informal evening seminar for high school students.

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A little x-ray news

More precious than rubies is confidence in the importance of what one does for a living. One thing we do for a living is to manufacture x-ray film. Unkind words are rarely spoken about society's need for x-ray film. Now we have news about x-ray film and need to make it seem important. Easy.

The first piece of news has it that *Kodak Industrial X-ray Film, Type M* is now obtainable with emulsion on one side only instead of both sides, the way x-ray film usually comes in order to double the strength of the image. Simple, yes; trivial, no. Ties in to the very large subject of mankind's current push for great structural strength in small mass. Load-bearing members are now getting so thin that putative flaws on their radiographs have to be checked out with a microscope. Since a microscope can focus on only one side of the film at a time, it's better to have the other side blank. Enough of this is being done now so that x-ray dealers are stocking the single-coated film of high contrast and fine grain.

Eastman Kodak Company, X-ray Division, Rochester 4, N. Y., will be glad to guide you to such a dealer.

The second piece of news much exceeds the first in importance. The nuclear testing debate has gone on for years. As an intelligent citizen, you have been given estimates by various authorities of how much radiation you and your children can expect to soak up, barring disaster. You have been told how much to figure for medical and dental radiological examination over a lifetime. Meanwhile we have been quietly goofing up the statistics! We have been upping the response of the films. With the latest step, the same amount of examination requires half or a third as much radiation as had been estimated.

No action is required on your part. Just privately rejoice a little at how the deal has been sweetened a bit for you, statistically.

To John!

$[-CH(CH_3)CH_2-]_n$

This tidy little plant cost us a tidy little sum. It stands in Longview, Texas, receives propane by pipeline, and is now ready to turn it into 20 million pounds of polypropylene per annum.

We are not alone. Seven other large and reputable companies are known to be playing in the game against each other and us. If none of the players' announced plans go awry, 460 million pounds of polypropylene capacity will exist in the United States *next year*. Sober estimates of demand range from a pessimistic 300 million pounds to an optimistic 450 million pounds *by 1965*. All we players must therefore be very brave, hide our nervousness, and raise our glasses high in a toast to the memory of Senator John Sherman, who believed in the great public good that comes of free and untrammeled competition.

As the game gets under way, we hold certain strong cards. Perhaps the other players will show you theirs, too. *Tenite Polypropylene*

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Sound tape, very sound

Eastman Sound Recording Tape has just started to enter the professional sound-recording market. The future will speak for itself, but for the present not a single reel of it is offered blank for home recording. (Digital recording tape is a different article.)

Eastman Tape differs from the best professional sound tape hitherto available only in uniformity, a pallid virtue but one not to be sneezed at because it made us what we are today in the motion-picture business, where a man who has to throw work away for technical inadequacy winds up slinking through back alleys.

Magnetic tape needs about the same thickness of coating as do the emulsions of a complicated color film, where much of the secret of success lies in niggardliness with thickness tolerance. Thickness variation of magnetic oxide coating shows up as spurious amplitude modulation. The oxide particles themselves closely match in size the silver halide crystals of a medium fine-grain photographic emulsion. The problems of preparing their surfaces for uniform distribution through a matrix are familiar to us. The answers turn out a little different from those first thought out, but satisfactory. Eastman Tape is no better than the best rolls of the best-regarded grade of the best-regarded other brand. Our methods, however, make *all* our rolls that good.

Eastman Sound Recording Tape *is currently sold only by Eastman Kodak Company, Motion Picture Film Department, 342 Madison Avenue, New York 17, N. Y.*

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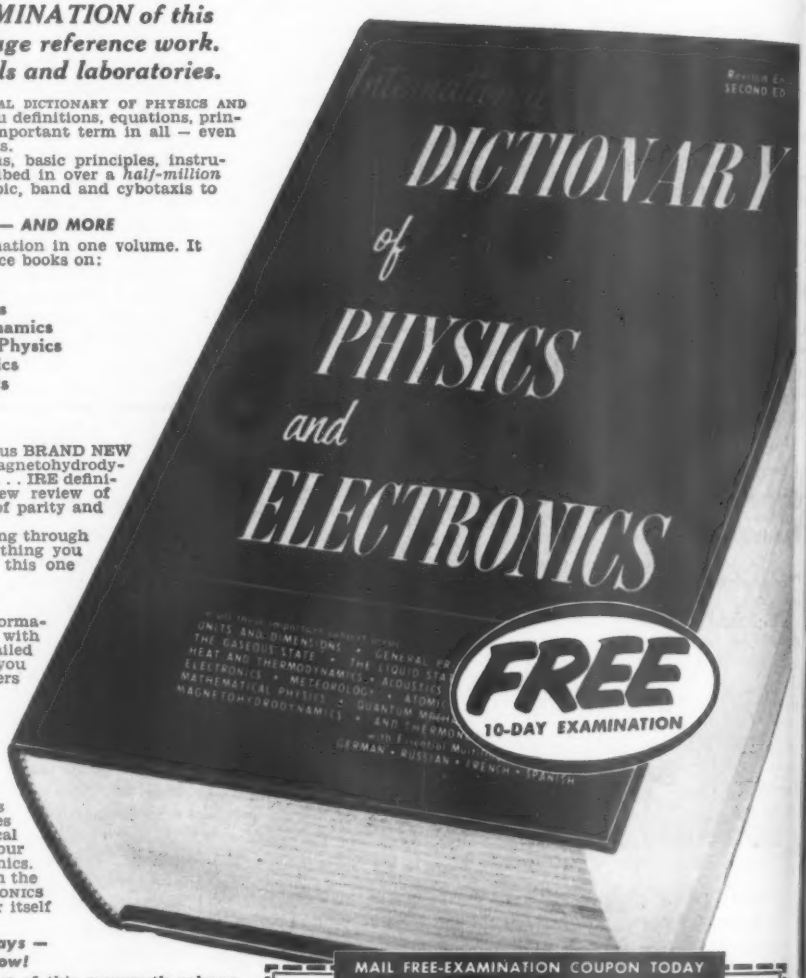

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PUBLIC HEALTH

If Allergic to Insects, Use Emergency Rules

▶ PHYSICIANS have been advised to furnish emergency kits with directions for use to all patients who are allergic to insects.

Sudden death is a real threat to persons who are stung again after once being sensitized to the protein substances of insects, Dr. Joseph H. Shaffer of Henry Ford Hospital, Detroit, states in the Journal of the American Medical Association, 177:473, 1961.

Generally accepted rules for avoiding insect stings in summer are:

Do not use hair oils and perfumes that attract stinging creatures by the odor.

Do not wear suede or other leather materials that have irritating animal smells.

Do wear white or light-colored clothes, which are less provoking than dark colors.

If faced with a stinging insect, do not panic and swing wildly at it. Walk away slowly.

Desensitization over a long period is advised for all who have experienced severe local or generalized allergic reactions from previous stings, Dr. Shaffer says.

The desensitization treatment consists of injections of whole body extracts of the wasp, hornet, bee and yellow jacket given at seven-day intervals at the start and tapering off to every four weeks over a three-year period.

• Science News Letter, 80:183 September 9, 1961

ICHTHYOLOGY

Greenland Sharks Lure Fish Food by Their Eyes

▶ A SLUGGISH SHARK probably captures its quick prey by using its eyes as a lure.

Tiny whitish shell animals attached to the eyes of the Greenland shark seem to act like a beacon attracting curious fish. The slow Greenland shark swallows them when they swim too close.

Intact remains of the quick sea trout, arctic char, in the shark's stomach strongly supports the idea, Dr. Bjorn Berland of the Institute of Marine Research, Bergen, Norway, reports. Greenland fishermen believe the attached animals are luminous but no definite proof exists, he reports in Nature, 191:829, 1961.

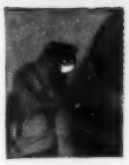
• Science News Letter, 80:183 September 9, 1961

Questions

BIOLOGY—At what temperature could sperm in a sperm bank be stored? p. 163.

TECHNOLOGY — How could atomic blasts benefit mining? p. 165.

Photographs: Cover, U. S. Fish and Wildlife Service; p. 163, Cenco Instruments Corporation; p. 165, F. C. Livingstone; p. 167, Minneapolis-Honeywell Regulator Co.; p. 184, Country Studio.



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• Science News Letter, 80:184 September 9, 1961

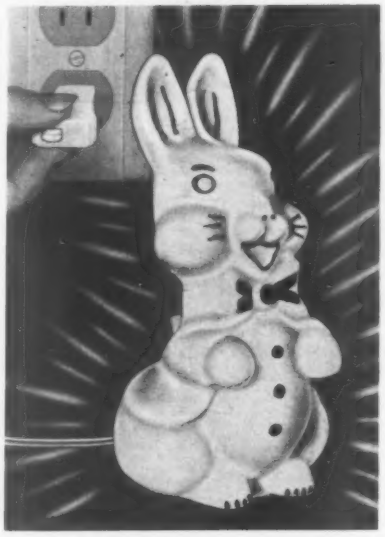
ALL-PURPOSE WATER PUMP that can deliver 400 to 500 gallons an hour with a 1/50th horsepower motor has a loosely fitted impeller and does not clog with sand or grit. Weighing only three pounds and having a flexible shaft, it can be used on boats to remove or supply water and in homes to remove water from cellars, pools, tanks and boilers.

• Science News Letter, 80:184 September 9, 1961

MINIATURE GROUNDING DEVICE prevents explosions on outboard motor boats due to static electricity. Containing tiny brass beads, it is only two inches in diameter but provides 40 square inches of grounding area. Installed on the transom below the water line, the device is connected to the permanent gas tank with ground wire included in kit.

• Science News Letter, 80:184 September 9, 1961

BUNNY NIGHT LIGHT, helpful in eliminating a child's fear of the dark, completely lights up with a soft glow. Made of durable porcelain with a smooth finish, the



yellow, pink or blue bunny with black features is six inches tall. Equipped with a 54-inch cord, bunny, shown in the photograph, can be plugged into any AC or DC outlet.

• Science News Letter, 80:184 September 9, 1961

GOLF BALL RETRIEVER serves also as an excellent shag for putting practice. It has a full-size vinyl grip and an aluminum 12-foot tubular handle that telescopes to the length of a golf club. The cup swivels when the ball is scooped up into an easy carrying position without manipulation of the handle.

• Science News Letter, 80:184 September 9, 1961

MINIATURE TOOL KIT has 10 tiny gold-color tools, each about the size of a small paper clip. Individually compartmented in a plastic pouch, the kit includes pocket knife, hammer, screwdriver, pliers, wrench, shears, axe and nutcracker, each with a hang-up ring.

• Science News Letter, 80:184 September 9, 1961

FINANCIAL RECORD BOOK to record serial numbers, dates and other data of stocks, bonds, deeds, etc., is an 8½-by-11-inch loose-leaf binder of flexible navy blue vinyl. It contains a supply of 12 different blank forms, each designed for recording a particular asset. Owner's name can be imprinted if desired.

• Science News Letter, 80:184 September 9, 1961

MUSICAL CIGARETTE BOX that plays a popular tune when opened looks like a miniature, classic bookcase of cherrywood, finished in walnut, whose shelves are lined with hand-painted simulated books. Having an overall size of 6⅞ by 3⅛ by 3-13/16 inches, it holds king or regular size cigarettes plus match books.

• Science News Letter, 80:184 September 9, 1961

Nature Ramblings

➤ MANY OF OUR COMMONEST weeds are imported, but one American plant has the somewhat doubtful distinction of sometimes amounting to a troublesome weed on its native soil. This is the pokeberry or pokeweed, also known simply as poke, scoke or garget.

It is a tall, thick-stemmed, abundant-leaved plant and it likes moist, rich land, especially newly broken plowed fields and clearings.

Right now, with summer flowers folding up, one by one, against the coming frosts, the pokeweed helps by decorating corners with stiff bunches of berries so purple they are almost black.

These same berries yield an amazingly purple juice that children can make into ink for their own amusement. The coloring might serve as a dye, but it would have to be teamed with an appropriate fixing agent and even then would find it difficult to compete with the cheaper, more standard aniline dyes.

In earlier days, the thick, asparagus-like shoots of the pokeweed furnished pot herbs.

Pokeberry

They were somewhat rank in taste unless they were very young, but when asparagus was scarce, they would do. They were even cultivated at one time, but not any longer.

The roots of the plant are yellow and intensely bitter, yielding a violent purgative drug. Eaten by accident for horseradish, they have caused serious illness and even death, so that use also is gone.

Robbed of all its possible occupations, the pokeberry has become a vagabond and a weed.

• Science News Letter, 80:184 September 9, 1961

Do You Know?

Patients entering mental hospitals with *schizophrenia*, manic-depressive or involutional psychosis now have at least a 65% chance of returning to community life within a few months.

Accidents will mar the *vision* of about 141,000 youngsters and more than 300,000 adults in 1961.

Corn has no mechanism for the dispersal of its seeds and is not capable of reproducing itself without the aid of man.

About 75% of the *cholesterol* present in the body is synthesized in the tissues, primarily the liver.

Ceramics, rather than iron and steel, may be the key materials for building the electric power generators of the future.

An estimated $252,000,000 is spent annually on *quack* cures for arthritis.

• Science News Letter, 80:184 September 9, 1961

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